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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/991,126	11/16/2001	Morten Nissov	1021	5214

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EXAMINER	
WANG, QUAN ZHEN	
ART UNIT	**PAPER NUMBER**
2633	

DATE MAILED: 08/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/991,126	NISSOV ET AL.	
	Examiner	Art Unit	
	Quan-Zhen Wang	2633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on *16 November 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *3/12/04* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *4/30/03*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "transmitter"; the "receiver"; and the "feedback loop" must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claim 16 is rejected under 35 U.S.C. 102(e) as being clearly anticipated by Onaka et al. (U.S. Patent US 6,785,042 B1).

Regarding claim 16, Onaka teaches a Raman assisted EDFA hybrid amplifier (fig. 31) comprising: a Raman amplifier variable gain portion (fig. 31, Raman amplification), an EDFA gain portion (fig. 31, EDFA82); and an optical attenuator (fig. 31, VATT 85) coupled to an output of the EDFA gain portion.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Onaka et al. (U.S. Patent US 6,785,042 B1).

Regarding claims 1, 16, and 26, Onaka discloses an optical communications system (figs. 47, 52, and 53) comprising: transmitter (fig. 47, optical sender OS 5) for transmitting an optical signal; receiver (fig. 47, optical receiver OS 6) for detecting the optical signal; and an optical fiber communications interposed between the transmitter and the receiver (fig. 47, the optical fiber links OS5 and OR 6), the optical fiber communications link comprising: at least one Raman assisted EDFA hybrid amplifier (fig. 47, the two hybrid EDFA and Raman amplifier systems; and figs. 52 and 53) having Raman amplifier variable gain portion (fig. 47, Raman amplification 7; figs. 52 and 52, Raman amplification) and an EDFA gain portion (fig. 47, EDFA 8; fig. 52, EDFA 81 and EDFA 82; fig. 52, EDFA 82). The system of Onaka differs from the claimed invention in that Onaka does not specifically teach an optical attenuator coupled to the output of the EDFA gain portion. However, it is well known in the art to use an optical attenuator coupled to the output of an EDFA gain portion. For example, Onaka in another embodiment (fig. 31) discloses the use of an optical attenuator (fig. 31, attenuator 85) to couple the output of an EDFA gain portion. Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to incorporate an optical attenuator, such as the one disclosed in fig. 31, in the system of figs. 47, 52, and 53 to couple output of an EDFA gain portion in order to adjust the output power from the amplifier system.

Regarding claims 2 and 17, Onaka further teaches at least one dispersion-compensation fiber disposed between the Raman amplifier variable gain portion and the EDFA gain portion (fig. 53, DCF 84).

Regarding claims 3 and 18, the system of Onaka differs from the claimed invention in that Onaka does not specifically teach that at least one dispersion-compensation fiber disposed within the Raman amplifier variable gain portion. However, it is well known in the art to include dispersion-compensation fiber disposed within the Raman amplifier variable gain portion. For example, Onaka in another embodiment (fig. 29) discloses to include dispersion-compensation fiber (fig. 29, DCF9) disposed within the Raman amplifier variable gain portion. Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to include dispersion-compensation fiber disposed within the Raman amplifier variable gain portion in order to compensate the attenuation of the optical signal in the dispersion compensation fiber.

Regarding claims 4 and 19, Onaka further discloses that the EDFA gain portion comprises a multi-stage EDFA (fig. 52).

Regarding claims 5 and 20, Onaka further discloses that a least one dispersion-compensation fiber disposed between stages of the multi-stage EDFA (fig. 52, DCF84).

Regarding claim 6, Onaka further discloses that the optical fiber communication link comprises plurality of optical fiber spans varying lengths connected and arranged between the transmitter and the receiver (fig. 47).

Regarding claims 7, and 28, Onaka further discloses that the system further comprising a second Raman assisted EDFA hybrid amplifier (fig. 47), wherein the at least one Raman assisted EDFA hybrid amplifier is configured to achieve an optimum

launch power for the second Raman assisted EDFA hybrid amplifier (column 3, lines 45-67 and column 4, lines 1-65).

Regarding claim 8, Onaka further discloses that the optical fiber communication link comprises plurality of the Raman assisted EDFA hybrid amplifier (fig. 47).

Regarding claim 9 and 24, Onaka further discloses that the optical attenuator of each the plurality of Raman assisted EDFA hybrid amplifiers adjusted to reduce the output power of the EDFA gain portion (fig. 31, column 20, lines 54-65).

Regarding claims 10, 25, and 27, Onaka differs from the claimed invention in that Onaka does not specifically teach that the output power is adjusted in 1 dB increments until optimum power is reached be launched into next adjacent Raman assisted EDFA hybrid amplifier. However, Onaka further teaches that the attenuator is used to control the output power. Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to adjust the power in 1 dB or other appropriate increments to optimize the power launched next into next adjacent Raman assisted EDFA hybrid amplifier in order to optimize the performance of the system.

Regarding claims 11 and 12, Onaka differs from the claimed invention in that Onaka does not specifically teach that the Raman amplifier variable gain portions are manually adjusted until the EDFA gain portions have substantially the same input power throughout the optical fiber communications link. However, Onaka further teaches to adjust the Raman amplifier variable gain portions (column 3, lines 22-67, and column 4, lines 1-65). Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to manually adjust the Raman amplifier variable

gain portions in order that the output power of the Raman amplifier is kept constant and the gain is flattened.

Regarding claim 13, Onaka further teaches that the Raman amplifier variable gain portions are adjusted by way of a feedback loop until the EDFA gain portions have substantially the same input power throughout the optical fiber communications link (figs. 52-53).

Regarding claim 14, Onaka further teaches that optical attenuator each the plurality Raman assisted EDFA hybrid amplifiers is adjusted to reduce the output power of the EDFA gain portion (fig. 31, column 20, lines 54-65), wherein the Raman amplifier variable gain portions are adjusted by way of a feedback loop until the EDFA gain portions have substantially the same input power throughout the optical fiber communications link (figs. 52-53).

Regarding claim 15, it is well known that the optical fiber span lengths range can be from about 30 to about 110 km.

Regarding claim 21, Onaka further teaches that the EDFA portion is a single stage EDFA (fig. 53).

Regarding claim 22, the system of Onaka can be configured to provide variable gain from the Raman portion and EDFA portion has a substantially constant input power.

Regarding claim 23, it is well known that the variable gain can range from about 1 to 16 dB.

Regarding claim 29, Onaka teaches a method of amplifying an optical signal on an optical fiber communications link (fig. 47) comprising: providing a plurality of Raman assisted EDFA hybrid amplifiers (the amplifier in fig. 47), each having a Raman amplifier variable gain portion (fig. 47, Raman amplification), an EDFA gain portion (fig. 47, EDFA 8); transmitting the optical signal on the optical fiber communications link (inherent); amplifying the optical signal through each of the Raman amplifier variable gain portions (inherent); amplifying the optical signal through each of the EDFA gain portions (inherent). The system of Onaka differs from the claimed invention in that Onaka does not specifically teach an optical attenuator coupled to the output of the EDFA gain portion, and attenuating the output power of the EDFA gain portions to add a predetermined loss to the output of each of the EDFA gain portions, whereby the launch power into the next Raman assisted EDFA hybrid amplifier is optimized and the input power into the EDFA gain portions are substantially the same throughout the fiber communications link. However, it is well known in the art to use an optical attenuator coupled to the output of an EDFA gain portion. For example, Onaka in another embodiment (fig. 31) discloses to use an optical attenuator (fig. 31, attenuator 85) coupled to the output of an EDFA gain portion. Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to incorporate an optical attenuator, such as the one disclosed in fig. 31, in the system of fig. 47 to couple output of an EDFA gain portion and attenuating the output power of the EDFA gain portions to add a predetermined loss to the output of each of the EDFA gain portions, the launch power into the next Raman assisted EDFA hybrid amplifier is

optimized and the input power into the EDFA gain portions are substantially the same throughout the fiber communications in order to optimize the performance of the system.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Taylor et al. (U.S. Patent US 6,178,038 B1) discloses a optical amplifier with Raman pumped dispersion compensation fiber to improve noise figure; Friedrich (U.S. Patent US 6,466,362 B1) discloses hybrid optical amplifiers including EDFA and a Raman amplifier to reduce the noise generated from the amplifier; Islam (U.S. Patent Application Publication US 2003/0058523 A1) discloses multi-stage optical amplifier including EDFA and Raman amplifiers.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Quan-Zhen Wang whose telephone number is (571) 272-3114. The examiner can normally be reached on 9:00 AM - 5:00 PM, Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

qzw
8/3/2005

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